

REMARKS/ARGUMENTS

Claim Rejections - 35 USC § 102

Claims 1-3, 6-8, 10-12, 20, 22-23, 28, and 31-34 were rejected under 35 USC 102(e) as allegedly being anticipated by Crawford et al. (US 2002/0160737, hereinafter, "Crawford").

Regarding Claims 1-3, 7-8, 10, 28, and 31-34:

Representative independent claim 1 recites in relevant part:

"...allocating the data to be transmitted among the plurality of transmit antennas, wherein *at least one of the plurality of transmit antennas transmits some data that is not transmitted by all of the other of the plurality of transmit antennas...*" (emphasis added).

Independent claims 7, 10, and 28 have a similar limitation.

This limitation describes a spatial multiplexing technique, in which a data stream is divided into independent and separately encoded data signals for transmission from multiple antennas, such that at least one of the transmit antennas will transmit some data that is not transmitted by all of the other transmit antennas.

Crawford deals with antenna diversity, and in particular, receive diversity (see e.g., paragraphs [007] and [0012]). Transmitter spatial multiplexing and receiver antenna diversity are distinct multiple antenna techniques; spatial multiplexing utilizes the ability to transmit multiple, independent data streams from multiple antennas for, e.g., increasing data rate, and receive diversity utilizes the ability of multiple receive antennas to receive and exploit multipath signals.

FIG. 1 of Crawford clearly shows a receiver, not a transmitter, and there is no mention in Crawford of "transmitting" past the second paragraph of the Detailed Description. Furthermore, Crawford does not describe transmitting or receiving using spatial multiplexing techniques.

Applicant submits that Crawford does not describe or suggest "...allocating the data to be transmitted among the plurality of transmit antennas, wherein *at least one of the plurality of transmit antennas transmits some data that is not transmitted by all of the other of the plurality of transmit antennas...*" (emphasis added). Accordingly, independent claims 1, 7, 10, and 28, and their dependent claims, are allowable over Crawford.

Regarding Claim 6:

Crawford states that the conventional 802.11a preamble is not sufficient for Crawford's proposed receive diversity scheme and describes a modified preamble that includes an additional field to "support higher order diversity branch probing scheme of the present invention." (see FIGS. 5 and 6, and paragraph [0055]).

Crawford makes no indication that backwards compatibility with conventional 802.11a receivers is either desirable or possible with their proposed modified preamble.

Applicant does teach backwards compatibility with conventional 802.11a receivers and communication in a wireless system including both legacy 802.11a devices and extended 802.11 devices. Claim 6 is directed toward a method of discriminating between packets in such a system. A device can discriminate between packets sent with a conventional 802.11a data rate and an extended data rate by multiplying a received long training subcarrier in the preamble of the packet by a conventional 802.11a long training pattern and an extended 802.11 long training pattern to form two products, and using those products to determine the type of packet (described in paragraphs [0044] to [0047]).

The Action characterizes 308 and 322 in FIG. 5 of Crawford as products generated by multiplying long training subcarriers by long training patterns. However, 308 and 322 are actual fields in Crawford's modified preamble (802.11a long training field and Crawford's additional field, respectively), not products used for discriminating between two types of packets. Applicant has reviewed the text of Crawford and can find no indication of multiplying a received long training subcarrier by two types of long training patterns to generate products to use for discriminating between types of packets. Accordingly, Applicant submits that Claim 6 is allowable.

Regarding Claims 11 and 12:

The Action characterizes Crawford as describing transmission techniques, referencing element 102 in FIG. 1 and elements 500, 502, and 504 in FIG. 9.

As discussed above, Crawford deals with receive diversity techniques, not transmission techniques. FIG. 1 clearly depicts a receiver, with received signals 110 received by diversity antennas 102 and provided to parallel RF receivers 104 and 106 (see also paragraph [0033]).

FIG. 9 shows a received signal spectrum resulting from two different receive antennas, with one

spectrum 500 including a deep fade 502 at one RF frequency and the other signal spectrum 504 including a deep fade 506 at another RF frequency. The deep fades 502 and 506 are results of multipath effects, and are not purposefully attenuated tones.

Applicant discloses utilizing subcarriers that are typically attenuated (“out-of-band”) between two 20 MHz channels by transmit filters in conventional 802.11a operation (FIG. 5). These previously unavailable out-of-band carriers are instead utilized in a multichannel (e.g., 40 MHz) transmission mode to carry signaling information and/or increase data rate ((FIG. 6, paragraphs [0050] to [0053]).

Claim 11 recites in relevant part:

“...allocating a first portion of the data among the plurality of transmit frequency bands and allocating a second portion of the data to *at least one out-of-band frequency range* when the first portion is allocated to adjacent bands, wherein *the at least one out-of-band frequency range includes an out-of-band frequency range between the adjacent bands ...*” (emphasis added).

Since Crawford does not disclose transmitting data on an out-of-band frequency range between adjacent bands, Applicant submits that independent claim 11, and dependent claim 12, are allowable.

Regarding claims 20 and 22-23:

Independent claim 20, as amended, recites in relevant part:

“...generating preamble fields of the packet to be transmitted, including an extended mode preamble distinguishable at a receiver from a conventional 802.11a preamble, the extended mode preamble including enough of a conventional 802.11a preamble structure *such that a conventional 802.11a receiver can decode one or more fields of the extended mode preamble and defer processing of incoming signals...*” (emphasis added).

As discussed above in reference to Claim 6, Crawford makes no indication that backwards compatibility with conventional 802.11a receivers is either desirable or possible with their proposed modified preamble. Crawford’s modified preamble includes an additional field between the short training and long training fields of the conventional 802.11a preamble structure, and hence Applicants submit that a packet with Crawford’s modified preamble would not be recognizable by a conventional 802.11a receiver.

Conversely, Applicant teaches backwards compatibility with conventional 802.11a receivers, and achieves this end in one embodiment by including enough of the conventional 802.11a preamble structure in the extended mode preamble such that a legacy 802.11a receiver could decode enough of the extended mode preamble to defer processing of incoming signals, e.g., by including a conventional 802.11a signal field, “which provides the receiver with information about the length of the packet and thus how long to defer” (paragraph [0055]).

Crawford does not describe or suggest providing enough of a conventional 802.11a preamble structure to enable a legacy 802.11a receiver to recognize at least a portion of the preamble and defer processing of the incoming packet. Accordingly, Applicant submits that independent claim 20, and its dependent claims, are allowable.

Claim Rejections - 35 USC § 103

Claims 9 and 35 were rejected under 35 USC 103(a) as allegedly being unpatentable over Crawford in view of Moose et al. (US 2002/0065407, hereinafter, “Moose”).

Claims 9 and 35 depend from allowable independent claims 1 and 28, respectively. Accordingly, Applicant submits that these claims should be allowed for the reasons given above.

Claims 13-19 and 24-27 were rejected under 35 USC 103(a) as allegedly being unpatentable over Crawford in view of Stuber et al. (US 2003/0076777, hereinafter, “Stuber”).

Regarding claims 13-19:

Independent claim 13 recites in relevant part:

“...receiving a signal from a wireless medium, wherein the signal was transmitted from an extended mode transmitter as a packet wherein packet data is preceded by a packet preamble and wherein the *packet preamble is generated from a cyclically shifted 802.11a preamble...*” (emphasis added).

The Action characterizes Crawford as disclosing, “a packet preamble and wherein the packet preamble is generated from a cyclically shifted 802.11a preamble (figure 5 and 6, para 0046, lines 1-13).” Neither of FIGS. 5 and 6 disclose a cyclically shifted 802.11a preamble, but rather modified preambles with diversity selection fields inserted between 802.11a short and long training fields. Paragraph [0043] does not disclose receiving a packet preamble generated

from a cyclically shifted 802.11a preamble, but rather a “diversity branch probing scheme” that “allows the cycling through of all L antenna branches n-branches at a time” (lines 11-13).

Stuber was cited merely for disclosing “demodulating the signal to obtain a demodulated signal; decoding from the demodulated signal.”

Applicant submits that neither Crawford nor Stuber teach or suggest, either alone or in combination, receiving a signal transmitted from an extended mode transmitter as a packet with preamble generated from a cyclically shifted 802.11a preamble. Accordingly, independent claim 13, and its dependent claims, are allowable over Crawford in view of Stuber.

Regarding claims 24-27:

Independent claim 24 recites in relevant part:

“...where the receiver is a conventional 802.11a receiver, processing the packet data sequence to determine at least one valid conventional 802.11a preamble field and *deferring further data reception related to that packet data sequence after determining, from the preamble, that the packet data sequence represents a packet not in conformance with a conventional 802.11a packet...*” (emphasis added).

As discussed above with reference to claims 20 and 22-23, Crawford makes no indication that backwards compatibility with conventional 802.11a receivers is desired or possible with their technique, whereas Applicant does and achieves this end by including enough of the conventional 802.11a preamble structure in the extended mode preamble such that a legacy 802.11a receiver could decode enough of the extended mode preamble to defer processing of incoming signals.

Stuber was cited merely for disclosing “at a receiver, demodulating the signal to obtain a demodulated signal; at the receiver, decoding, from the demodulated signal.”

Accordingly, independent claim 24, and its dependent claims, are allowable over Crawford in view of Stuber.

Allowable Subject Matter

Claims 4, 5, and 29 were indicated to be allowable if rewritten in independent form. Claims 4, 5, and 29 have been so rewritten.

CONCLUSION

In light of the amendments contained herein, Applicants submit that the application is in condition for allowance, for which early action is requested.

Please charge any additional fees or credit any overpayments that may be due with this response to Deposit Account No. 170026.

Respectfully submitted,

Dated August 7, 2008
:

By: /Kenyon S. Jenckes/

Kenyon S. Jenckes, Reg. No. 41,973
858-651-8149

QUALCOMM Incorporated
Attn: Patent Department
5775 Morehouse Drive
San Diego, California 92121-1714
Telephone: (858) 658-5787
Facsimile: (858) 658-2502